planting of lettuce in lower Colorado Valley. Spring lettuce making excellent growth in Phoenix area. Heavy harvest of mixed vegetables in Salt River Valley. Cauliflower and brussel sprout harvests getting underway in volume in Phoenix area. Quality excellent of all vegetables, except carrots only good. Cotton fields being cleaned; some disced. Melon planting and irrigation in Yuma Valley, with tomato planting started.

CALIFORNIA.--San Francisco: Light to moderate showers in north and central on 4th through 7th brought weekly precipitation totals near or above normal. Soil moisture continued deficient in south where generally no rain during week. Temperatures above normal in north and central California, and slightly below normal in southern coastal valleys. On north and central coasts, rains and wet ground prevented fieldwork, except limited pruning in orchards and vineyards and some repair to flood damaged fields and orchards. Weather favorable for pastures and ranges. In Monterey County, harvesting broccoli, celery, and artichokes despite muddy fields. In upper Sacramento Valley, rain and wet ground delayed and hindered strawberry plant harvesting and orchard pruning, but above-normal temperatures favorable for growth of range grass and fall-planted grains. Some orange picking beginning in lower Sacramento Valley. In upper San Joaquin Valley, light rains very beneficial in replenishing soil moisture; dryland grains growing very nicely, and ground right for planting potatoes and preparing soil for planting other spring crops. Wet ground prevented fieldwork in Santa Maria area, except some seeding of new strawberry beds and a little harvesting of broccoli, celery, cauliflower, and carrots. Cold nights in Los Angeles area conducive to coloring of navel oranges, and some warm days beneficial for sizing citrus fruit. Rain needed for all crops, especially grain and pastures, and irrigation continues in citrus groves. Serious deficiency of soil moisture continued in San Diego County. In Imperial County, weather favorable for plant growth and harvesting activities, but cool nights held back alfalfa.

FLORIDA.--Jacksonville: Average temperatures slightly below normal in north and much below normal on peninsula. Frost into Everglades on 1st and 2d. (See Freeze in Florida on page 4.) Freezing temperatures and frost deep in Everglades on 6th and 9th. Light to moderate rains in north night of 3d and 4th, otherwise very little precipitation. Fresh to strong winds depleted topsoil moisture. Young citrus trees injured by cold; extensive irrigation of groves necessary; purple mite troublesome in central; fruit harvesting active. Hardy truck fair to good. Tender varieties suffered locally heavy damage from frost, and growth generally retarded. Protective measures effective for much of strawberry crop and damage largely limited to retardation. Irrigation widely used and rain badly needed for all crops. Preparations for spring crops active.

TEXAS.--Austin: Cool nights and mild days, with no rainfall reported at any station. Dormant small grains and winter cover crops struggled along, but holding up surprisingly well. Some small grain fields thinning out as drought-weakened plants died. All areas indicated urgent need for rain. Some fieldwork for 1956 season started. Irrigated commercial vegetables in south good progress. Active harvest of cabbage, carrots, cauliflower, and spinach. Seeding of cantaloupes, sweet corn, tomatoes, and watermelons underway in south. Onions in south in good condition. Dry weather in north delaying onion transplanting. Mild weather plus heavy supplemental feeding of bundle feed and cake permitted cattle to remain in fair to good condition.

WEATHER AND THE NAVIGATION OF THE SEA

N. L. Canfield, National Weather Records Center, Asheville, N. C.

A sesquicentennial tribute to Mathew F. Maury in recognition of his pioneer work in collecting, summarizing, and mapping weather reports to facilitate navigation at sea which gave a significant impulse to the formation of weather services for shipping on the high seas.

The weather which makes up the climate over the water as well as the land masses of the world affects many of man's activities. Its vagaries from day to day are noticed by all of us. But few are more keenly aware of the atmosphere about us than those who "go down to the sea in ships."

Historically, storms and the sea are virtually synonomous. The mariner of old who left the relative comforts and safety of home for adventure on the high seas and in foreign ports knew, that whatever his reason for going to sea, there were real risks. Not the least of these risks was the weather. His sailing ship might founder in a hurricane or be becalmed for days, or even weeks, in the oppressive "doldrum belt" of the equatorial regions.

THE DEVELOPMENT OF MARITIME COMMERCE

After the discoveries of Columbus, numerous voyages of exploration were made. Colonization of the New World-America - began and trade between countries grew in ever increasing volume. Foreign trade became more lucrative and competition between nations for foreign commerce and financial returns caused shipbuilding to flourish. Business enterprise dictated faster ships and the famed Clipper Ships made the United States a nation to be reckoned with in the martime world.

The Clipper Ship era in this country was in full swing by 1840 and continued until the outbreak of the Civil War. The first large Clipper was built in 1833, although smaller ships known as Baltimore Clippers had been built earlier. Many of the larger Yankee Clippers were put into service immediately in the steadily growing trade with the Far East.

The Clipper Ships with their vast areas of canvas were, of course, propelled solely by wind and ocean currents. The ships were designed for speed, but a Clipper's full capabilities could never be realized unless her Master knew with some exactness the winds and currents of the world's oceans. Typically, the 19th century ship captain was far from ignorant of such matters. Much was already known about the prevailing wind belts around the globe and the circulation of the ocean currents. But more exact information was needed, if the navigation of sailing ships was to reach peak efficiency.

How often does the wind blow from certain directions? How strong is the wind usually? Destined to provide carefully calculated answers to such basic questions was a Virginian - Mathew Fontaine Maury - born near Fredericksburg, Va., on January 14, 1806, 150 years ago. When he reached the age of 5, Maury's family moved to Franklin, Tenn. -- Farther from the sea he was to later study so thoroughly. Through boyhood, his determination to follow in the footsteps of his oldest brother and join the U. S. Navy grew stronger. In 1825, one year after his brother died (while on Naval duty), Maury obtained a "warrant" and became a midshipman. Later commissioned as an officer, he made several cruises and continued on regular Navy duty for over a decade.

THE PATH TOWARD MORE EFFICIENT NAVIGATION

In 1839, Maury's sea-going career was brought to an abrupt end by a stagecoach accident. He suffered a broken leg that was improperly set and left him with a permanent limp. He was not again permitted to return to active sea duty. In 1842, he was made Superintendent of the Depot of Charts and Instruments, forerunner of the present Naval Observatory and the U. S. Navy Hydrographic Office. In his new position, astronomy and navigation were to be the subjects of his principal duties. But he noticed that his depot was also the storage place for old discarded ships' logbooks. He began to study the books' contents and soon visualized that practical knowledge of winds and ocean currents could be more than an unwritten tradition among seamen. The wind observations from the old logbooks could be compiled and charts prepared so that "the navigator may find the best paths at all seasons." He began tabulating the data from the old logbooks and in the autumn of 1847, after nearly 5 years' work, issued his first "Wind and Current Chart of the North Atlantic." The chart, as Maury put it, was "eloquent with facts" — in sharp contrast to generalized textbooks and imperfect recollections of only a relatively few voyages passed on by word of mouth from one generation of seamen to the next.

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M. F. Maury
Lt. U.S.N.

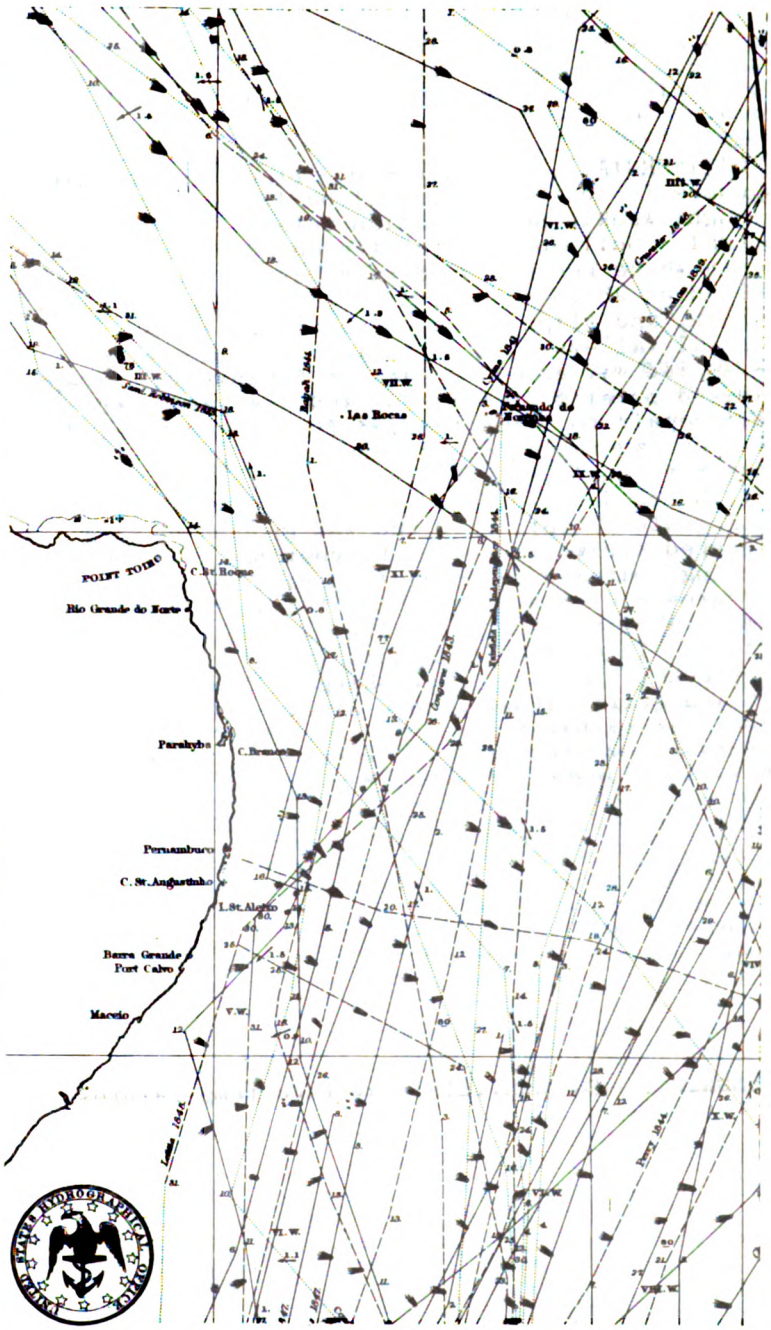
n integral part of the new chart was his interpretation the data the chart contained. His analysis indicated the ites or tracks that ships should follow during the various isons. Early in 1848, the Captain of the barque W.H.D.C. IGHT used Maury's routes to sail from Baltimore to Rio de neiro in 35 days, returning in 40 days. The average time the southbound trip up to then had been 55 days. Maury's ediction that a voyage following his route might be short-ed by 10 to 15 days was more than fulfilled.

The news of this event spread quickly. In the meantime, ury had devised an "Abstract Log for the Use of American igators." Those who recorded the weather on these special ther logs and sent them to Maury when completed would re-ive a copy of the "Wind and Current Chart" free of charge. ter the voyage of the WRIGHT, Maury could look forward to quick spread in this exchange system and the gradual elim-ation of the need to work with dusty logbooks, kept without stem, and with little or no regard for the data he wanted. the end of 1848, several thousand copies of his first art had been distributed to mariners who had asked for one l had agreed to keep an abstract log.

Other wind and current charts followed, which included ade Wind Charts," "Thermal (temperature) Charts," "Storm l Rain Charts,""Whale Charts," and "Pilot Charts." The prehensive "Pilot Charts" still issued by the Hydrographic fice developed directly from Maury's original ideas. The ling Directions, published by the same agency, began with ury, who authored eight editions, the last appearing in the r 1858. Maury's writings were climaxed by his monumental sical Geography of the Sea, later translated into 6 foreign guages. Modern marine meteorology and oceanography may said to date from this impressive, original work first olished in 1855. The eighth and last American edition of s work was published in 1861.

In 1853, Maury's efforts to obtain international agreement a uniform system of observing the weather at sea were alized. Brussels, Belgium, in that year, was the scene of first international scientific meeting of its scope ever d. Nearly all the major maritime nations of the day were presented at this conference. The conference was convened gely as a result of Maury's efforts and it proved instru-ital in putting his ideas into truly widespread use. Just modern ocean weather science dates back to Maury, inter-tional weather codes (like those used to transmit the ob-vations plotted on the daily weather maps) began with ury and his fellow scientists in 1853.

A Section Taken From MAURY'S WIND AND CURRENT CHART, South Atlantic, Series A, Sheet No. 2.



NOTE.--The winds are denoted by small brushes, the head of the brush pointing to the direction whence the wind blows, the character of the brush designating the character of the wind, and the divergence of its sides the extreme variation in direction of wind. Squalls are represented by dashes appended to the character with which they are connected.

Currents are denoted by arrows, the length of the arrow being propertionate to the strength of the current, which is also expressed in knots and decimals by numerals placed by the side of the arrow.

The Roman numerals denote the degrees of magnetic variation as observed by the vessel near whose track they are placed.

The figures with a line under them, thus 80 shows the temperature of the water.

An unbroken line represents the first month of the season, a broken line represents the second month, and a dotted line the third or last month of the season.

The names of men-of-war or government vessels are in Roman letters, the names of merchant vessels in Italics

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PRACTICAL RESULTS

While his scientific contributions were great, the practical applications were to be measured in terms of millions of dollars. In May 1854, Hunt's Merchants' Magazine estimated that the annual savings to the American and British Merchant shipping in foreign trade had amounted to 2-1/4 million and 10 million dollars, respectively, since the use of Maury's routes became widely used.

As an example in terms of time saved, the use of Maury's routes decreased the average passage from east-coast ports to Australia by one-third of the 124-day average previously logged.

Ordinary but opportunist citizens directly benefited from Maury's research as well -- those who, beginning in 1849, joined in the gold rush to California by Clipper Ship. Preferring the sea route around Cape Horn to struggling overland across the country, they travelled on the Clippers which made many remarkable voyages over Maury's routes. The trip of the famous FLYING CLOUD in 1854 from New York to San Francisco in 89 days set the record, but the utility of Maury's "directions" were better shown by the consistency which fast passages were made. Eighteen separate voyages required less than 100 days, though the average for the Clippers was somewhat greater. The 18 were accomplished despite the variability of winds along many parts of the route and the strong westerly winds often encountered "head on" while rounding Cape Horn.

Although the telegraph was just coming into use, its value in meteorology was not beyond Maury's vision. He was disturbed by the loss of 1,000 lives and property damage amounting to 10 million dollars on the Great Lakes from 1854 to 1857. To all who would listen, including civic leaders of the Great Lakes region, he actively advocated use of the new invention to transmit weather reports so that all concerned might be warned by "observations made today as to the weather you may expect tomorrow."

This was in 1857 and 1858. Similarly, in 1856, he was pointing out in some detail to the U. S. Agricultural Society how weather observations from many points in the continental United States, reported daily by telegraph under a uniform system, could immensely benefit farmers. A little over a decade later -- in 1870 -- the Congress directed establishment of a national weather service, and a warning service to Great Lakes shipping, such as Maury envisioned, soon began.

However, Maury's fame rests most firmly on his work with the historical weather records found in the old ship logs. From it has evolved the present marine climatological service of the Weather Bureau. But in place of the earlier long and tedious extraction and tabulation of the observations by hand, several types of electronic data processing machines are now used to quickly compile numerical facts about the weather of past months and years. Such facts are used to plan activities and design equipment for use over periods of time beyond those for which it is possible to forecast the weather from today's weather maps.

PRESENT MARINE WEATHER SERVICE

Today, compilation and analysis of ships' weather observations continues to be a major function among the Weather Bureau's climatological services. As more observations are received (now nearly 500,000 annually), it is becoming possible to present more detailed information on ocean climates and to study variations in weather over the oceans more closely.

The weather of the oceans affects many activities in which weather is a factor. The basic reason: The vast oceans are a major source of atmospheric moisture with evaporation of water vapor into the air from the sea surface taking place continually. As we learn more about ocean climates, in turn the vagaries of the weather over both continent and ocean will become better understood.

For day-to-day shipping operations, ships of all nations now benefit from the free exchange by radio of both surface and upper air observations, using internationally agreed upon codes. The observations originate from ships at sea and from established weather stations on land. Together, the observations and exchange systems make possible daily forecasts of the weather over the world's oceans, now issued by many nations. Each nation has specific ocean forecast areas, for which it is responsible, with the World Meteorological Organization acting as coordinator for these and other weather services not solely national in character.

Hair-raising tales of man against the sea, although no longer commonplace, still come into being, for man has not yet conquered nature. But advances in the art of seamanship, the techniques of search and rescue, and the sciences of Naval architecture, electronics, and meteorology today continue to work toward still safer and more efficient navigation at sea.

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